

CLAIMS

We claim:

1. A ballast water treatment system, comprising:
at least one filtration system for removing at least a portion of the suspended solids from ballast water;
at least one disinfectant injector for injecting at least one disinfectant into the ballast water treatment system;
at least one mixer for mixing an ionized gas with the ballast water; and
at least one ionized gas injector coupled to the at least one mixer for injecting ionized gas into the ballast water in the at least one mixer.
2. The water treatment system of claim 1, wherein the at least one disinfectant injector further comprises a disinfectant generator for generating disinfectant materials from saltwater.
3. The water treatment system of claim 2, wherein the disinfectant generator comprises a housing containing a plurality of conduits having electrical cells for exposing electricity to saltwater flowing through the conduits.
4. The water treatment system of claim 3, wherein the disinfectant generator further comprises a single inlet coupled to a header that distributes saltwater to the plurality

of conduits and at least one of the conduits has a valve upstream of an electrical cell and a valve downstream of the electrical cell.

5. The water treatment system of claim 3, wherein the disinfectant generator further comprises at least one sensor positioned downstream of an electrical cell in at least one of the plurality of conduits.

6. The water treatment system of claim 3, wherein the disinfectant generator further comprises at least one bypass conduit for controlling flow of saltwater through the conduits of the disinfectant generator.

7. The water treatment system of claim 3, wherein the disinfectant generator comprises between about four conduits and about twenty conduits, each having an electrical cell.

8. The water treatment system of claim 1, wherein the ionized gas injector comprises an ionized gas generator formed from a plurality of chambers, each chamber containing a plurality of ultraviolet lamps and each chamber adapted to allow a gas to pass through the ionized gas generator.

9. The water treatment system of claim 8, wherein the plurality of ultraviolet lamps comprise between about one ultraviolet lamp and about twenty ultraviolet lamps

extending from a first end of the ionized gas generator to a second end of the generator generally opposite to the first end.

10. The water treatment system of claim 9, wherein the plurality of chambers are coupled in parallel.

11. The water treatment system of claim 9, wherein the plurality of chambers forming the ionized gas generator comprises thirty chambers.

12. The water treatment system of claim 1, wherein the at least one filtration system comprises at least one drum screen with an automatic cleansing system.

13. The water treatment system of claim 1, further comprising at least one filter downstream of the at least one mixer.

14. The water treatment system of claim 13, wherein the at least one filter is comprised of at least a duplex filter system.

15. The water treatment system of claim 1, further comprising a recirculation loop coupled to a downstream location of the water treatment system for recirculating water through the water treatment system if the water, after passing through the water treatment system, does not meet selected standards.

16. A water treatment system, comprising:

at least one filtration system upstream of the collection device for removing at least a portion of suspended solids from the ballast water;

at least one disinfectant injector for injecting at least one disinfectant into the ballast water treatment system downstream of the at least one collection device;

at least one disinfectant generator in communication with the at least one disinfectant injector for generating disinfectant materials from saltwater, the disinfectant generator comprising a housing containing a plurality of conduits having electrical cells for exposing electricity to saltwater flowing through the conduits;

at least one mixer for mixing an ionized gas with the ballast water;

at least one ionized gas injector coupled to the at least one mixer for injecting ionized gas into the ballast water in the at least one mixer; and

at least one ionized gas generator formed from a plurality of chambers, each chamber containing a plurality of ultraviolet lamps and each chamber adapted to allow a gas to pass through the ionized gas generator.

17. The water treatment system of claim 16, wherein the disinfectant generator further comprises a single inlet coupled to a header that distributes saltwater to the plurality of conduits and at least one of the conduits has a valve upstream of an electrical cell and a valve downstream of the electrical cell.

18. The water treatment system of claim 16, wherein the disinfectant generator further comprises at least one sensor positioned downstream of an electrical cell in at least one of the plurality of conduits.

19. The water treatment system of claim 16, wherein the disinfectant generator further comprises at least one bypass conduit for controlling flow of saltwater through the conduits of the disinfectant generator.

20. The water treatment system of claim 16, wherein the disinfectant generator comprises between about four conduits and about twenty conduits, each having an electrical cell.

21. The water treatment system of claim 16, wherein the at least one filtration system comprises at least one drum screen with an automatic cleansing system.

22. The water treatment system of claim 16, further comprising at least one filter downstream of the at least one mixer.

23. The water treatment system of claim 22, wherein the at least one filter is comprised of at least a duplex filter system.

24. The water treatment system of claim 16, further comprising a recirculation loop coupled to a downstream location of the at least one mixer for recirculating water

through the water treatment system if the water, after passing through the water treatment system, does not meet selected standards.

25. A method of removing contaminants from ballast water on vessels, comprising:

passing ballast water through at least one filtration system for removing at least a portion of suspended solids from the ballast water;

generating at least one disinfectant using saltwater using at least one disinfectant generator comprising a housing containing a plurality of conduits having electrical cells for exposing electricity to saltwater flowing through the conduits;

injecting the at least one disinfectant into the ballast water;

generating at least one ionized gas; and

injecting the at least one ionized gas into the ballast water contained in at least one mixer adapted for mixing an ionized gas with the ballast water.

26. The method of claim 25, wherein generating the at least one ionized gas comprises passing a gas through at least one ionized gas generator comprising a plurality of chambers, wherein at least one chamber contains a plurality of ultraviolet lamps and each chamber is adapted to allow a gas to pass the through the ionized gas generator.

27. The method of claim 25, wherein generating the at least one disinfectant comprises receiving saltwater from a body of water, passing the saltwater through a

plurality of conduits including electrical cells, and imparting electricity to at least a portion of the saltwater passing through the disinfectant generator.

28. The method of claim 25, wherein passing ballast water through the at least one filtration system comprises passing ballast water through at least one drum screen having an automatic cleansing system.

29. The method of claim 25, further comprising passing the ballast water through at least one filter downstream of the at least one mixer.

30. The method of claim 25, further comprising passing the ballast water through a recirculation loop for recirculating the ballast water through the ballast water treatment system if the ballast water, after passing through the ballast water treatment system, does not meet selected standards.